

**CLAIMS**

1. A system for measuring ground reaction force and analyzing the performance of an athlete in which force sensors are located in the athletes shoe and a three dimensional accelerometer is located adjacent the athletes centre of mass and the signals from the accelerometer and the force sensors are recorded and used to derive the three orthogonal components of the ground reaction force (GRF).

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2. A system as claimed in claim 1 in which the sensor signals are used to derive ground reaction force by using an artificial neural network to derive the three orthogonal components of GRF.

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3. A system as claimed in claim 1 in which centre of mass acceleration, in shoe load and ground reaction force are measured simultaneously.

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4. An athlete monitoring system comprising
  - a) at least one force sensor in at least one shoe to sense in-shoe load
  - b) communication means associated with said force sensor
  - c) a tri-axial accelerometer adapted for location adjacent the athletes centre of mass
  - d) an electronics module including a receiver for receiving signals from said force sensor and a processor for processing signals from said force sensor and said accelerometer to derive ground reaction force from the in shoe load and centre of mass acceleration references to ground reaction force.

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5. An athlete monitoring system as claimed in claim 4 in which the communication from the force sensor to the electronics module is wireless.
6. An athlete monitoring system as claimed in claim 4 in which centre of mass acceleration, in shoe load and ground reaction force are measured simultaneously.

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- 5       7. An athlete monitoring system as claimed in claim 4 in which an artificial neural network is used to represent relationships between the in shoe load measurements and the centre of mass acceleration to the three orthogonal components of ground reaction force.
- 10       8. An athlete monitoring system as claimed in claim 4 wherein piezoresistive sensors are deployed at the major anatomical support structures in the foot as the in shoe force sensors.